Vol. 110 No. 13 May 28, 1949

The American FERTILIZER

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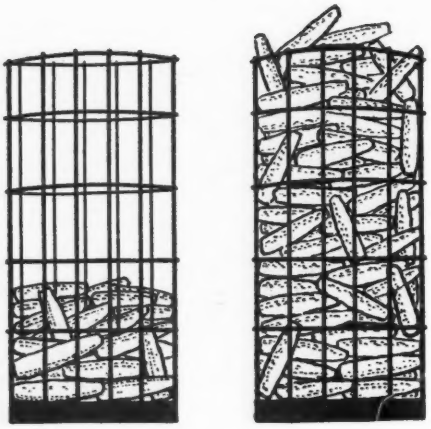

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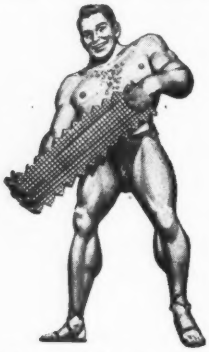

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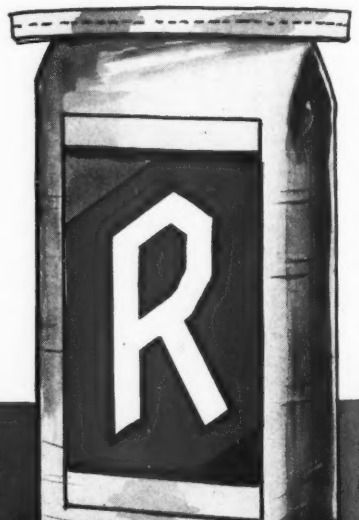

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The American FERTILIZER

Vol. 110 MAY 28, 1949 No. 11

N. F. A. Annual June Meeting

Annual Meeting of the National Fertilizer Association at White Sulphur Springs, June 13 to 15. Interesting Program of Addresses and Recreational Events Prepared. Election of Directors

THE program which has been prepared for the 24th annual June Convention of the National Fertilizer Association, to be held at the Greenbrier, White Sulphur Springs, W. Va., on June 13th, 14th and 15th, promises to be one of the most interesting ever presented during the long history of the Association. The officers and Convention Committee have prepared a well-balanced schedule of talks which cover the world food situation, the current business outlook, and developments in fertilizer technique. An added feature this year will be an inspection of nearby pasture demonstrations on the opening afternoon of the convention.

The committees on recreational features have done a good job of scheduling golf, tennis, and horseshoe pitching competitions, and have assembled an impressive array of prizes for the successful contestants. Golf, tennis and bridge tournaments have also been arranged for the ladies and in addition there will be three attendance prizes awarded for the ladies at the Annual Banquet on the 14th.

Election of Officers and Directors

During the convention, the members of the various districts of the Association will fill by district elections any vacancies on the Board of Directors caused by expiration of term, resignation, etc. At the Tuesday general meeting, the Association will also elect four directors-at-large; those whose terms expire are M. S. Hodgson (Empire State Chemical Co.), John E. Powell (Smith Agricultural Chemical Co.), J. E. Totman (Summers Fertilizer Co.), Louis Ware (International Minerals & Chemical Corp.). At the close of the convention, the new Board of Directors will meet to elect officers for the 1949–1950 Association year.

Schedule of Meetings

MONDAY, JUNE 13

8:00 A. M. Meeting of the Executive Committee

9:00 A. M. Registration

4:00 P. M.

10:00 A. M. Meeting of the Board of Directors

10:00 A. M. Open meeting of the Plant Food Research Committee

1:00 P. M. Assemble in lobby for tour of nearby pasture demonstrations; everyone invited

9:30 P. M. Meeting of the Nominating Committee

TUESDAY, JUNE 14

10:00 A. M. General Meeting

Annual convention address: Ray King, Chairman of the Board of Directors

Address: "The World Can Feed Itself," Louis Bromfield, author of "Malabar Farm"

Address: "Fertility Levels and the Quality of Canning Crops," Charles H. Mahoney, director, Raw Products Research Bureau, National Canners' Association

Address: "Soil Factors Affecting Responses of Crops to Fertilizers," George N. Hoffer, manager, Midwest Office, American Potash Institute

7:30 P. M. Annual dinner: Chas. S. Rauh, toastmaster

WEDNESDAY, JUNE 15

10:00 A. M. General Meeting

Address: "Our Industry's Safe-Guards," President Russell Coleman

Address: "The Business Outlook, with Particular Reference to Capital Expenditures," Dexter M. Keezer, director, Department of Economics, McGraw-Hill Publishing Company

Address: "Conservation, Proper Land Use, and Fertilizer," Kent Leavitt, president, National Association of Soil Conservation Districts

Unfinished business

New business

Memorial service

12:30 P. M. Adjournment, followed by annual meeting of the new Board of Directors

Golf Tournament

The Golf Committee has arranged a well-rounded series of competitions for the three afternoons of the meeting, to be played on the famous Greenbrier course. Various events for members will be held on Monday, Tuesday and Wednesday. The Veterans' Competition is scheduled for Tuesday, June 14th. A new feature this year is a special tournament for those who are attending as the invited guests of the Association. The other competitions are reserved for members or affiliates of the Association or their representatives.

For the ladies, there will be an 18-hole medal handicap tournament on Tuesday, June 14th. In addition two putting contests for ladies will be held on Monday, June 13th: for golfers, at 10 A. M.; for non-golfers, at 3 P. M.

The Men's Golf Committee is composed of A. L. Walker, Jr., *Chairman;* B. A. Crady, Morton S. Hodgson, Tom L. Jones, John W. Rutland, H. B. Siems. The Ladies' Golf Committee includes Mrs. J. E. Totman, *Chairman;* Mrs. E. M. Kolb, Mrs. Roy S. Marsden, Mrs. Frank R. Dulany (golfers' putting), Mrs. J. P. Brinton, Jr. (non-golfers' putting).

Tennis Tournament

The tennis tournament will cover the afternoons of all three convention days. It is planned to have both men's singles and doubles competition and ladies' singles and doubles competition. The committee in charge includes James C. Totman, *Chairman;* James E. Cope, Chas. F. Martin, Mrs. Garland D. Glover.

Horseshoe Pitching

The horseshoe pitching competition, which has been growing in popularity each year, is in the capable hands of A. A. Schultz, *Chairman;* C. R. Martin, H. A. Parker. The contests will be held on the afternoons of Monday, Tuesday and Wednesday, and will be limited, as are the other recreational events, to members or affiliates of the Association or their representatives, or to specially invited guests. The contests will be governed by the rules of the National Horseshoe Pitchers' Association of U. S.

Ladies' Bridge Tournament

The ever-popular ladies' bridge tournament will be held on the afternoons of Tuesday and Wednesday. A contestant may choose which day she wishes to play. An adequate supply of attractive prizes has been provided. The arrangements are in charge of Mrs. Burton A. Ford, *Chairman;* Mrs. R. D. Martenet, Mrs. Weller Noble, Mrs. R. A. Oliphant, Mrs. W. S. Tyler.

Hospitality

Chairman Ray King, of the Board of Directors, has appointed the following Hospitality Committees: A. Norman Into, Chicago, is chairman of the men's hospitality committee; and members are: Albert B. Baker, Jr., New York City; J. E. Barnes, New York City; Richard E. Bennett, South Omaha, Nebr.; J. H. Daughtridge, Wilmington, Del.; Norman H. Eason, El Dorado, Ark.; E. M. Kolb, New York City; C. E. Lightfoot, New York City; Roy S. Marsden, New York City; R. D. Martenet, Indianapolis; C. R. Martin, Dayton, Ohio; Harold S. McCormick, Jr., New York City; A. F. Miller, Chicago; J. L. Nichols, Sumter, S. C.; John R. Riley, Jr., Kansas City, Mo.; Wm. E. Snyder, Los Angeles; and Trenton Tunnell, Atlanta.

Mrs. J. P. Brinton, Jr., New York City, heads the ladies' hospitality committee. Mem-

(Continued on page 32)

Production of Serpentine Superphosphate in New Zealand*

By R. E. R. Grimmett, M.Sc. and I. L. Elliott, B. Agr. SS

Superintendent and Assistant Superintendent respectively, Soil Fertility Station, Department of Agriculture, Hamilton, New Zealand

NEW ZEALAND is dependent upon overseas sources of rock phosphate for the manufacture of superphosphate, the most commonly used phosphatic fertilizer. Most soils are phosphate-deficient and the efficient use of phosphates is of utmost importance to New Zealand. War-time shortages of rock phosphate supplies and the evidence given by preliminary field trials led to a decision to revert part of the superphosphate manufactured with serpentine. Three parts of superphosphate were mixed with one part serpentine, to manufacture serpentine superphosphate.

Serpentine superphosphate was introduced because:

1. On a weight-for-weight basis it gave results equivalent to superphosphate, with a potential saving of 33 1/3 per cent of phosphate.
2. It did not rot bags or injure germination when sown in contact with seed; it stored well and ran freely through farmers' drills.

Observational trials on pastures and yield trials with annual crops have given a consistent indication that, weight-for-weight, serpentine superphosphate is equivalent to superphosphate. The evidence from pasture mowing trials is as yet inadequate to form a clear picture of the efficiency of the P_2O_5 content of serpentine superphosphate as compared with that of superphosphate.

Where soil and climatic conditions are similar to those in New England, serpentine superphosphate should be worthy of trial.

The Role of Phosphate in New Zealand

Of the major plant foods which are added to the soil, the most important under New Zealand conditions is phosphate. This does not imply that there is any lack of areas where potash or other materials may be even more important than phosphate. Such areas are, however, of limited occurrence, whereas lack of phosphate is almost universal in New Zealand soils. Phosphatic fertilizers are applied mainly to pastures, but their role in crop and fruit production is equally important although a much less total quantity is expanded on these items. Of the phosphatic fertilizers the most important is superphosphate and materials derived from superphosphate by reversion with either serpentine or lime. There is a limited scope for the more insoluble forms of phosphatic fertilizers such as finely-ground rock phosphates from various sources and basic slag. These materials achieve their best results and are most popular in areas of high rainfall; that is, over 45 inches per annum, and where soil conditions tend to be acid.

Sources of Supply of Rock Phosphate

Following the conclusion of World War I, New Zealand was fortunate in obtaining sources of supply of high-grade rock phosphate for superphosphate manufacture by the setting up of the British Phosphate Commission, which, on behalf of three member countries, Great Britain, Australia and New Zealand, controlled the output of phosphate rock from Nauru and Ocean Islands. This organization has served New Zealand well both in peace and war.

New Zealand is almost entirely without native sources of phosphate rock, although the very minor deposits which do occur are chiefly associated with the limestones in the Clarendon district south of Dunedin. These deposits were fully described by Macpherson (*1*).** Here there are two types of deposit; one is a medium grade phosphate rock which was used early in the history of superphosphate manufacture in New England. The importation of phosphate rock from overseas at considerably lower cost led to the abandonment of quarrying operations. The other

*A paper to be presented at the United Nations Conference on the Conservation and Utilization of Resources, to be held at Lake Success, N. Y., August 17 to September 6, 1949. This paper will be discussed t the session on Inorganic Fertilizers, August 26, 1949.

**See references at end of paper.

deposit is a low-grade material containing some 10 to 12 per cent P_2O_5. As will be shown later, an attempt was made to utilize these materials to offset the shortage of fertilizers which resulted from the entry of Japan into the war.

War-time Shortages

Prior to World War II New Zealand was using annually over 600,000 tons of phosphatic fertilizers comprised of about 500,000 tons of superphosphate and superphosphate derivatives, 100,000 tons of basic slag and other finely-ground phosphates from a variety of sources such as North Africa and Seychelles and Walpole Islands. The southward advance of the Japanese into the Pacific, in which vital supply lines were cut, and the overall shortage of shipping which resulted from hostilities led early in the war to a shortage of rock phosphate. From an annual importation of some 400,000 tons of rock phosphate, supplies were quickly reduced to some 120,000 tons. At the same time New Zealand became a base for a large number of American troops. New Zealand had sent overseas large numbers of its male population and was asked by the Combined Food Board to produce food to its maximum capacity. All these circumstances combined to render necessary the optimum ultilization of supplies of fertilizer received from overseas and also the exploitation of whatever sources of plant food material existed within the country.

Method by which Optimum Utilization of Resources Was Attempted

Just prior to the War and during its early stages a considerable amount of work had been carried out on the possibility of reverting superphosphate with serpentine rock—a step first suggested by some work carried out by Druschnin (*2*). The suggestion was advanced and backed up with a certain amount of experimental evidence [A. G. Elliott (*3*)] that this procedure would result in producing a more effective type of fertilizer and would consequently assist in conserving supplies. The procedure which was adopted was to mix one part of finely-ground serpentine rock with three parts of superphosphate as it came hot from the den. The resulting stock pile was then allowed to mature when reversion took place.

The experimental evidence upon which the decision to revert all superphosphate manufactured in New Zealand was taken was reviewed by A. G. Elliott and P. B. Lynch (*4*) and by A. G. Elliott (*5*) and was as follows:

(*1*) Evidence from mowing trials on pastures which showed that 4 cwt. of serpentine superphosphate was equally as efficient as 4 cwt. of ordinary superphosphate.

(2) Evidence from a large number of observational trials on pasture which indicated that equal quantities of serpentine superphosphate and superphosphate gave equal responses.

(3) Evidence from a large number of field trials with crops, which indicated that serpentine superphosphate was equal on a weight-to-weight basis with superphosphate. There was also a certain amount of confirmatory evidence from pot trials.

In view of the evidence as it was then available, the National Council of Primary Production recommended the Minister of Agriculture to enforce the manufacture of superphosphate into serpentine superphosphate. The main difficulty which then arose was to supply adequate quantities of serpentine to allow this to be done, as sources of supply were distant from the site of manufacturing works and there was shortage of railway trucks. As a result, the output of fertilizer works was never completely reverted to serpentine superphosphate. Quite apart from the fact that serpentine superphosphate at this stage appeared to be giving good results in the field, there were other circumstances which influenced the decision of the National Council. There were the better physical qualities of the product which made it easier to store and easier to deliver through farm machinery; further, it caused no appreciable germination injury when sown in contact with seeds. There was also its important attribute of having very little effect on bags. This factor was important in view of the possible shortage of jute goods which was likely to arise as the result of Japanese penetration towards India and the disruption of shipping in the Indian Ocean.

The second major method which was adopted to eke out the scanty supplies of available fertilizer was by the introduction of fertilizer rationing. This was done for pasture land by means of allocating a certain percentage of the fertilizer used during the two-year period ended May, 1941. Each annual crop was allocated a specific quantity per acre.

The third attempt to increase available supplies was made by reopening up the deposits at Clarendon, which have already been referred to. Some 7,000 tons of medium grade rock phosphate were used for superphosphate manufacture, but the low-grade

(Continued on page 28)

Mathieson Announces Changes in Sales Executive Staff

Mathieson Chemical Corporation has announced changes in its Sales Department executive staff as the result of the retirement of E. E. Routh, Vice President, Director of Sales. D. W. Drummond has been named Vice President, Director of Industrial Chemical Sales and S. L. Nevins has been named Vice President, Director of Agricultural Chemical Sales.

All heavy chemicals including sulphuric acid will be handled by the Industrial Chemical Sales Department. All agricultural chemicals which have been added as the result of recent acquisitions of Southern Acid and Sulphur Company and Standard Wholesale Phosphate & Acid Works, Inc., will be under the direction of the Agricultural Chemical Sales Department.

Other appointments are as follows: J. O. Logan becomes Sales Manager, Industrial Chemicals; R. J. Quinn, Assistant Sales Manager, Industrial Chemicals; L. P. Thomas Southwestern Sales Manager, Industrial Chemicals; J. S. Whittington, Sales Manager, Agricultural Chemicals. Mr. Thomas will be in Houston, Texas, and Mr. Quinn and Mr. Whittington will be in Baltimore, Md. All others will be located in Mathieson's executive offices in New York.

Quackenbush Warns Against Misleading Fertilizer Names

Indiana farmers are being offered various low grade phosphate fertilizers under names that may be misleading to buyers unless they pay strict attention to the statements appearing on the Indiana fertilizer tag, according to Dr. F. W. Quackenbush, state chemist, Purdue University Agricultural Experiment Station.

For example, private advertising circulars use the terms "20 per cent phosphate," "20 per cent colloidal phosphate," "Crop-phos 20" or "Cal-phos 20 per cent" which mean that the materials contain 20 per cent of total phosphoric acid; only a small part of which is immediately available to plants. This is in contrast to 20 per cent superphosphate which has been treated so as to make it immediately available to plants.

"Official Indiana fertilizer tags provide for a statement of either total phosphoric acid or available phosphoric acid or both and a careful study of the tag is necessary for the purchaser to be sure he is getting his money's worth in available plant food," says Quackenbush. He states that one advantage of the official tag system, in effect in Indiana since 1881, is that the printing of the tags is in the hands of the state chemist. So-called "colloidal phosphate" in Indiana must be called "rock phosphate with colloidal clay" which correctly describes the material. Although this material often has the appearance of superphosphate, it usually consists of the washings from high grade rock phosphate, is high in iron and aluminum phosphate and contains a large percentage of clay. Iron and aluminum phosphates have the lowest availability of all the untreated phosphates which have been used for direct application as a source of phosphorus.

Instances have been found where 20 per cent rock phosphate with colloidal clay is selling for as much or more than the higher grades of rock phosphate testing up to 33 or 34 per cent total phosphoric acid. This indicates that some farmers are not paying strict attention to values when they buy plant food.

March Superphosphate Production

Another million-ton superphosphate production was recorded in March, according to the figures of the U. S. Bureau of Census. A total output (basis, 18% A. P. A.) of 1,013,581 short tons was only 2.7 per cent below the record production of 1,041,728 tons produced in March, 1948. For the first quarter of 1949, total output was 2,710,692 tons compared with 2,875,232 tons in the same period of 1948.

Shipments to dry mixers during March amounted to 778,900 tons while another 532,207 tons was used in the plants which produced it. This brought the supply on hand at producing plants on the last day of March down to 963,129 tons.

Production	Normal 18% A.P.A. Tons	Concentrated 45% A.P.A. Tons	Base Goods 18% A.P.A. Tons
March, 1949.....	900,725	41,848	8,236
February, 1949...	748,153	41,319	5,384
March, 1948.....	939,802	37,752	7,546
Shipments and used in producing plants			
March, 1949.....	1,187,138	44,746	12,104
February, 1949...	896,509	44,504	10,940
March, 1948.....	1,016,225	42,022	13,612
Stocks on Hand			
March, 1949.....	803,475	61,738	5,309
February, 1949...	1,065,307	64,034	9,177
March, 1948.....	832,744	63,424	5,683

THE AMERICAN FERTILIZER

ESTABLISHED 1894

PUBLISHED EVERY OTHER SATURDAY BY
WARE BROS. COMPANY
317 NORTH BROAD ST., PHILADELPHIA 7, PA.

A Magazine International in scope and circulation devoted exclusively to the Commercial Fertilizer Industry and its Allied Industries

PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

A. A. WARE, Editor
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ANNUAL SUBSCRIPTION RATES

U. S. and its possessions, also Cuba and Panama.....$3.00
Canada and Mexico..... 4.00
Other Foreign Countries..... 5.00
Single Copy..... .25
Back Numbers..... .50

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Pelleted Seeds Need More Research

By H. J. CAREW

Interest in the pelleting or coating of vegetable seeds has been fostered to a considerable extent by popular articles speculating on the potentialities of the process, rather than by spectacular field results. These potentialities, to be sure, are quite impressive, particularly to the seedsman or vegetable grower anxious to improve production methods. However, it may be of benefit to evaluate critically these proclaimed advantages in the light of recent trials and experiments and to present disadvantages that have arisen to date.

Seeds are ordinarily coated or pelleted by alternate layers of a sticker and a coating material. Ultimate size of the individual pellet depends upon the kind of seed and the quantity and type of coating material used. Both the sticker and the coating material are chosen for their nontoxicity to germinating seeds and their noninterference in the germination process. Under ideal conditions the finished product is a spherically shaped ball containing a single seed.

With seeds literally wrapped in individual packages, they could be spaced at desired intervals. Precision planting of cauliflower, lettuce, cabbage, tomatoes, and carrots has been made possible by using pelleted seed. If successful, such a planting technique would decrease thinning costs, particularly on such a crop as lettuce, and would be of marked benefit where tomatoes or cruciferous crops are field-seeded. However, in New York State pelleted vegetable seeds have often given discouraging results. Normally clean seed sent to a commercial pelleting concern returned with up to 30 per cent "dummy" pellets. The pelleting process had coated many bits of dirt and chaff. With lettuce and pepper many of the pellets contained two or three seeds, which increased rather than decreased thinning problems.

Working with lettuce on muck, Doctor George Raleigh of the Vegetable Crops Department, found that pelleted seeds came up two to three days later than unccated seeds. This would not be serious except that emergence was uneven and hence caused a prolonged harvesting period. Mr. H. Arnason of the Department of Agricultural Engineering found that pelleting with an inert material

*Reprinted from *Farm Research*, New York Experiment Station, Geneva, N. Y.

delayed come-up whether the soil was dry, saturated with moisture, or intermediate. The delay was more acute when soil crusts were present.

Onion seed coated with fungicides has been found by Doctor A. G. Newhall of the Plant Pathology Department to be less affected by onion smut, and is now available from certain seed companies.

Possibly the greatest future for the pelleting process lies in the incorporation of fertilizer elements in the pellet. Preliminary work in other sections of the country indicates better germination and quicker come-up from such pelleted seeds.

Pelleted seed may allow wider use of chemical weed killers. Activated carbon surrounding the seed may protect it from the harmful effects of 2, 4-D. At least one commercial pelleting concern has found this to be true. Also, by delaying come-up, coating seed may allow the increased use of pre-emergence weed-control techniques.

Other advantages claimed for pelleted seed are the need for less seed, longer storage life, and the possibility of adding bird and insect repellants.

With pelleting costs relatively high, especially for small lots of seed, the added expense is not insignificant. The pelleting process increases seed weight approximately 15 to 50 times, depending on the kind of seed. This results in increased bulk and raises handling costs.

One handicap to the use of pelleted seed is the shortage of planting equipment that will accurately space individual seeds, place them at a uniform depth, and cover them adequately.

In summary, the pelleting of vegetable seeds has a promising future. However, much more research is necessary to determine the best combination of coating material, fertilizer, and fungicides for each kind of seed.

Jensen Appointed to American Cyanamid Agricultural Staff

F. S. Washburn, Director, Agricultural Chemicals Division, American Cyanamid Co., has announced the appointment of Arthur O. Jensen as agriculturist for the Midwestern states.

Mr. Jensen recently obtained a B.S. degree in Agronomy from the University of Wisconsin where he also served as assistant in the Soils Department. His headquarters will be at Madison, Wisconsin.

Del-Mar-Va Annual Meeting

The annual meeting of the Del-Mar-Va Peninsula Fertilizer Association will be held at the George Washington Hotel, Ocean City, Md., on Saturday, June 25th. All members of the fertilizer industry are invited to attend this meeting and spend an enjoyable day on the famous Eastern Shore.

Bemis Houston Multiwall Bag Plant Reaches Full Production

Bemis Bro. Bag Co. has announced that its multiwall plant in Houston has reached full production and is capable of supplying all types of multiwall paper shipping sacks in the Texas area.

This plant was acquired last year and has been in partial operation for several months, with the installation of new machinery progressing during the partial operation period. It is the seventh Bemis multiwall plant now in full production, and is under the management of the existing Bemis bag manufacturing facilities in Houston.

Carswell Named Vice-President of Commercial Solvents

The Board of Directors of Commercial Solvents Corporation has announced the appointment of T. S. Carswell as vice-president in charge of research and development.

Mr. Carswell has for the past three years been manager of the company's research and development department. He was formerly with Monsanto Chemical Company.

Bagpak Division Makes Changes in Sales Personnel

International Paper Company's Bagpak Division has announced that effective May 9th the following changes were made in the personnel of its branch sales offices:

A. C. Clarke was appointed district sales manager in Atlanta, Georgia. Mr. Clarke has been associated with the Division for many years in Chicago and Boston. C. C. Crain will continue to operate out of Atlanta. W. D. Peters, who has also been operating out of Atlanta, has joined the sales organization of the head office in New York.

J. A. Groden is now district sales manager in Boston. Mr. Groden was formerly connected with the head office in New York.

April Tag Sales

Fertilizer tax tag sales kept pace during April with the record-breaking figures reported for February and March. In the 14 states which require that fertilizer manufacturers attach a tax tag to each bag of fertilizer sold within their borders, the tags sold during April were sufficient to cover 1,206,000 short tons of fertilizer, according to reports furnished by state control officials to The National Fertilizer Association. The April figure represents an increase of 11 per cent over the tonnage recorded for the same month last year and of 32 per cent over that of April, 1947.

The 5,885,000 tons of fertilizer represented by the tags sold from January through April, 1949, exceeds the comparable figure for any previous year, running approximately 16 per cent higher than the January–April 1948 total and 28 per cent above the corresponding four-month total of two years ago. On a fiscal year basis, current figures are also substantially higher than any previously recorded. From July 1948 through April 1949, tag sales totaled 9,017,000 equivalent short tons, 9 per cent more than in the same period a year earlier and 19 per cent more than the comparable 1946–47 figure.

The figures for April 1949 were higher than those of a year ago mainly because of increases reported by the Southern states, whose combined total of 1,057,000 tons was almost 20 per cent above that reported for April 1948. The South's cumulative January–April total of 5.0 million tons and July–April total of 7.2 million tons were also considerably hi her than earlier year figures.

(Continued on page 32)

FERTILIZER TAX TAG SALES
(In Equivalent Short Tons)
Compiled by The National Fertilizer Association

State	April		Calendar Year Cumulative January–April		Fiscal Year Cumulative July–April	
	1949	1948	1949	1948	1948—49	1947—48
Virginia	80,178	82,006	420,203	380,518	611,109	605,700
North Carolina	229,775	175,754	1,187,597	977,930	1,651,535	1,497,968
South Carolina	105,780	75,302	723,380	582,618	959,320	922,210
Georgia	161,627	176,864	908,915	835,180	1,168,878	1,047,698
Florida	53,735	37,503	383,007	322,674	731,181	766,555
Alabama	208,122	158,308	560,022	599,348	836,386	745,800
Tennessee	94,842	78,797	218,540	189,906	360,112	308,167
Arkansas	65,178	37,788	181,852	94,426	270,260	139,790
Texas	42,510	45,012	240,166	211,997	449,472	402,671
Oklahoma	14,810	16,107	69,510	72,296	114,760	111,753
Total South	1,056,557	883,441	4,983,192	4,266,893	7,153,013	6,548,312
Indiana	45,505	67,099	276,419	289,862	783,494	762,992
Kentucky	52,021	74,699	304,224	285,747	515,553	501,144
Missouri	46,770	46,155	261,962	206,238	447,718	323,251
Kansas	5,108	13,770	60,039	45,975	117,637	120,655
Total Midwest	149,404	201,723	902,644	827,822	1,864,402	1,708,042
Grand Total	1,205,961	1,085,164	5,885,836	5,094,715	9,017,415	8,256,354

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FERTILIZER MATERIALS MARKET

NEW YORK

No Changes in Price Schedules for Next Year's Fertilizer Chemicals Noted. Organics Had Brisk End-of-Season Demand. Bone Meal and Castor Pomace Still Scarce. Strikes Hamper Phosphate Rock Production. More Potash Expected Next Year

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, May 25, 1949.

Sulphate of Ammonia

Demand continued good in most sections for this material but was not as urgent as this time last year. It is believed that there will be little change in the new price schedule when it is announced by most producers shortly.

Nitrate of Soda

While imported material was not in too free a supply, domestic material was available to most buyers and a good demand was noted from the South for top dressing. Imported material was being shipped out as fast as it arrived.

Ammonium Nitrate

No price changes were noted and demand continued good with production slightly better in most plants.

Organics

Organic fertilizer materials displayed a firm tone as manufacturers finished out their mixing season and there was considerable demand from various sections for last minute requirements. Blood and tankage were steady at $8.00 per unit of ammonia ($9.72 per uit N), f.o.b. various shipping points and the feed trade were also buyers. Soybean meal was in good demand at $62.00 per ton, f.o.b. Decatur, Ill., and cottonseed meal for quick shipment was not plentiful. Linseed meal was easier in tone due to lack of demand from the feed trade. Prices were heard as low as $53.50 per ton, f.o.b. Minneapolis.

Castor Pomace

This material was not being offered by the producers, due to present low rate of production. Last sales were made at $21.00 per ton and buyers seem to be eager to contract but there was no material available. Whether this situation will continue is hard to forecast.

Fish Meal

With most fish factories about ready to start fishing, some easing in the present fish meal market was looked for, but spot fish meal was still commanding good prices and was hard to locate. No further sales were noted on an "if and when made" basis. Several lots of imported fish meal arrived at various ports.

Bone Meal

This material continues as the No. 1 scarce item in fertilizer materials. With continued low production still in evidence, the scant supplies are eagerly sought after by the buyers. No change in the supply situation is expected for some little time ahead.

Hoof Meal

Scattered sales were made on basis of $7.00 per unit of ammonia ($8.51 per unit N), f.o.b. productions points.

Superphosphate

It is reported that several strikes have occurred at phosphate rock mines, which has cut down the amount of phosphate rock available for the production of this material. Some of these strikes have been settled but production has been somewhat hampered. More triple superphosphate is expected to be produced the coming year when several new plants go into operation.

Potash

With most of the producers having made announcement of their contract prices for the coming fertilizer year on the same basis as present schedules, buyers felt in a more comfortable position as far as this material was concerned. The production has been increased by several companies and, although the demand continues heavy, buyers have been able to fill their requirements to better advantage this season than last season.

PHILADELPHIA

Materials Adequate for End of Season. Better Future Supplies of Nitrogen and Potash Expected. Strikes in Phosphate Rock Mines

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, May 23, 1949.

With the winding up of the mixing season, there does not seem to be any great scarcity of any of the regular raw materials, and there is very little demand. The prospects for next season are for a much more abundant supply of nitrogen and potash. And there should be ample phosphoric acid if there is not too much labor trouble at the mines.

Sulphate of Ammonia.—While some producers are reported soliciting orders for next season at $45.00 to $48.00 per ton in bulk, others are said to be offering contracts on the basis of price in effect at time of delivery. Meanwhile, the present supply position is tight with deliveries mostly on existing contracts. It is fully expected there will be increased supplies of this material next season.

Nitrate of Soda.—With Chilean material moving regularly per schedule, and distribution of domestic grade considerably increased, and with falling off in demand, the supply position has greatly improved. No price changes are reported.

Blood, Tankage, Bone.—Little interest is being shown in blood and tankage and quotations have been made at $7.25 to $7.50 per unit of ammonia ($8.82 to $9.12 per unit N). Bone meal continues exceedingly scarce and practically all deliveries are against contract. Some steamed bone was quoted at $75.00 per ton, but the quantity was limited.

Castor Pomace.—There are no offerings of prompt, material and shipments on contract are somewhat restricted due to cut in production.

Fish Scrap.—The fishing season will not open for several weeks and a goodly portion of the anticipated catch has already been contracted for. Sales have been reported at $135.00 to $140.00 per ton for deferred delivery, while prompt menhaden meal has been offered at $190.00 to $200.00 per ton.

Phosphate Rock.—Strikes at the rock mines are affecting production. Demand is quite strong, keeping the supply position tight. There is some fear that a price advance may take place.

Superphosphate.—Supply position is rather unsatisfactory. Labor difficulties at the rock mines have retarded shipments of the raw rock and some acidulators are reported unable to operate. Market is firm but no price changes reported.

Potash.—Prices for the new season have been announced and are practically the same as last year. The supply position is still tight and demand quite strong.

CHICAGO

Market on Organics Continues Active. Prices Hold Firm with Some Competitive Concessions

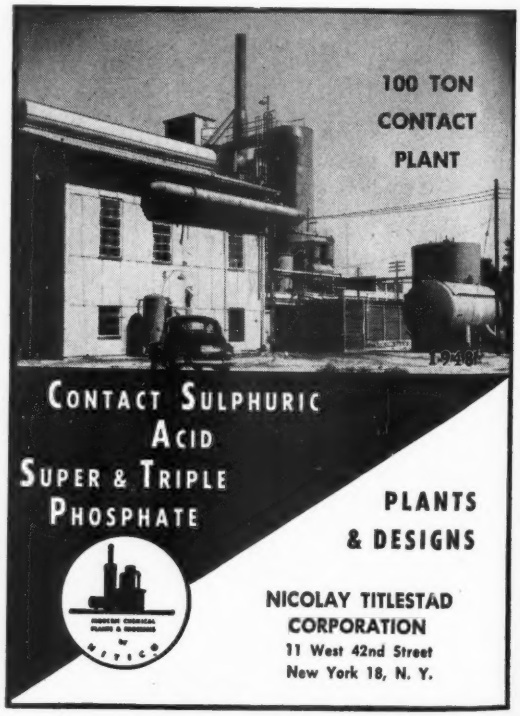
Exclusive Correspondence to "The American Fertilizer"

CHICAGO, May 23, 1949.

A strong and healthy condition continues in the midwestern markets on animal ammoniates. Buying interest for all feeding materials is keeping pace with production although trading is still restricted to material for nearby shipment.

The market on meat scraps has advanced to $120.00–$125.00 per ton, sacked, and in most cases this price is f.o.b. shipping point. In more highly competitive territories the price may be delivered. Digester tankage is steady at $108.00 to $110.00 per ton although sellers are endeavoring to obtain a premium of $2.00 to $4.00 per ton.

Dry rendered tankage is firm at $2.10 to $2.15 per unit of protein delivered. Most producers are asking these prices f.o.b.



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shipping points. Dried blood is not too strong at $7.00 per unit of ammonia ($8.51 per unit N) delivered, but wet rendered tankage is holding fairly steady at $8.00 to $8.50 (9.72 to $10.33 per unit N), depending upon quality and location. Steamed bone meal is unchanged at $75.00 per ton and raw bone meal at $65.00 per ton.

CHARLESTON

Buyers Cautious About Next Season's Materials. Ammoniates in Demand. Rock Strikes Curtail Superphosphate Output

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, May 23, 1949.

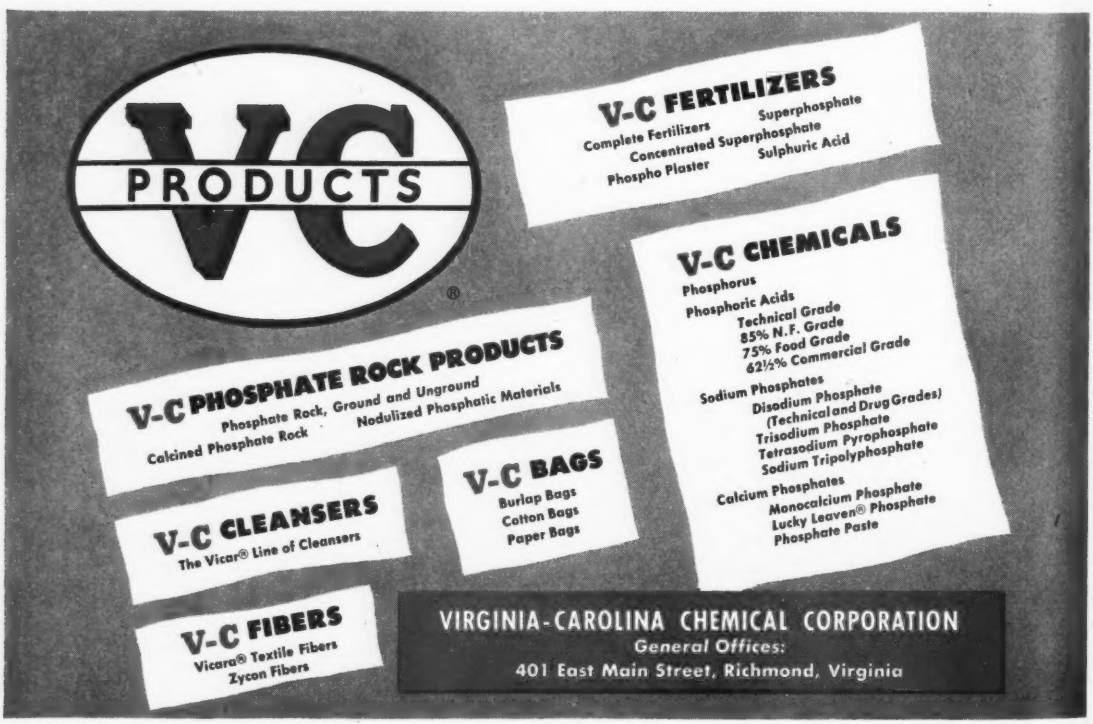
Buying for the new season on the part of manufacturers is rather cautious in view of general economic conditions. However, considerable tonnages of organic ammoniates have been sold for the new season and buyers at present are beginning to estimate needs of all fertilizer materials for the new season. Superphosphate production has been curtailed and serious shortages in certain areas of the midwest have developed. Potash demand continues steady and another producer has announced contract price for the new season.

Organics.—Fertilizer buyers are beginning to show interest in organics for the new season. Quite a quantity of castor pomace has been sold, as well as nitrogenous tankage, although only one producer of nitrogenous tankage will quote for fall shipment. Price range from $3.00 to $4.00 per unit of ammonia ($3.64 to $4.86 per unit N), f.o.b. production points.

Castor Pomace.—Producers of castor pomace are completely sold up for the time being. The market is nominally $21.00 per ton in bags, f.o.b. northeastern production points. Movement is entirely against current contracts.

Dried Ground Blood.—The Chicago market is described as steady at around $7.00 per unit of ammonia (to 8.51 per unit N), in bulk, with the New York market more or less nominal at $8.00 to $8.25 per unit of ammonia. ($9.72 to $10.02 per unit N).

Potash.—Demand continues active and customers are taking shipment steadily. Another producer has announced contract prices for the new season with muriate, 60% minimum at 45½ cents per unit in bulk carlots of minimum 40 tons, f.o.b. Trona, California. Shipments in bags cost slightly extra. This producer reserves the right to adjust prices to meet competition. Usual seasonal discounts will hold.



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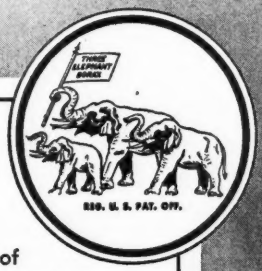
Muriate of Potash

Potash, one of the important ingredients of mixed fertilizer, is a vital soil nutrient which aids crop production and helps resist plant diseases. To provide the maximum of this important plant food, we are operating full capacity at Trona, 24 hours a day.



Three Elephant Borax

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops. When Boron deficiencies are found, follow the recommendations of your local County Agent or State Experimental Stations.

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"Pioneer Producers of Muriate in America"

Phosphate Rock.—Production of superphosphate generally has been seriously curtailed by strikes at several of the mines recently. A few strikes have been settled but shutdowns were necessary in three producers' mines. The market has reacted by strengthening as regards price.

Superphosphate.—Some acidulators have had to curtail operations and in many instances stop production of superphosphate as a result of strikes at the phosphate rock mines, creating shortages in certain areas.

Sulphate of Ammonia.—It is reported that some producers have written contracts for the new season, allowing for price adjustment at time of shipment but usually based on contract price of $45.00 to $48.00 per ton f.o.b. production point, on coke oven material. Synthetic sulphate of ammonia will be priced higher and synthetic producers are surveying buyers' requirements. Demand at present is relatively slack as most buyers have finished this season's operations.

Ammonium Nitrate.—Demand is seasonal but more and more price resistance is being shown on the part of ultimate consumers, particularly for imported material when moved to the southeast.

Fertilizer-Insecticide Ruled Out in North Carolina

Inspectors of the North Carolina Department of Agriculture have been instructed to issue "stop sale" orders on a brand of fertilizer advertised as effective in the control of insects, according to an announcement by Assistant Commissioner D. S. Coltrane.

Agricultural research specialists are skeptical of the usefulness of fertilizer-insecticide combinations, Coltrane said, and the Department of Agriculture has not authorized the sale of such preparations in North Carolina.

Named in the "stop sale" instructions were Bycolife 4-10-6 and 5-10-5 grades when advertised or labeled as containing material for the control of insects on plants.

An advertisement recently published in a North Carolina newspaper over the name of the Bycolife Fertilizer Manufacturing Company of Clinton, S. C., stated that its products contained a liquid which is absorbed by plants and renders them immune to chewing and sucking insects.

Sale of these products, which have been registered with the department as required by law, is entirely legal as long as they meet stated specifications and are not misbranded

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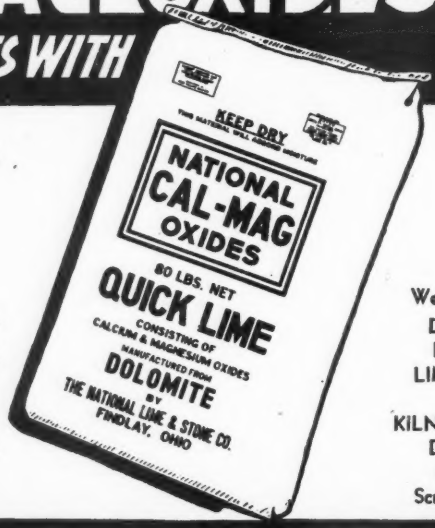

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In many agricultural areas the control of weeds by 2,4-D amine sprays has not been practical because of undesirable precipitates resulting from *hard* water dilution.

Now, the full benefits of 2,4-D sprays are available everywhere when *Pittsburgh* 2,4-D amine solutions are used . . . because to *Pittsburgh* 2,4-D there has been added a carefully controlled quantity of our Iminol-D. This addition not only increases the effectiveness of the solution but also prevents plugging and clogging of spray equipment.

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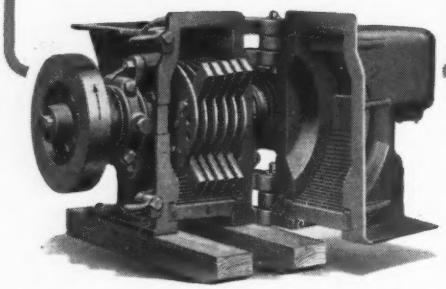

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Sturtevant Pulverizers are also used for grinding practically all fertilizer materials, such as tankage, cottonseed meal, nitrate of soda, etc., used in a dry mixing plant.

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or mislabeled, Coltrane explained. He added, however, that they should not be offered as a combination fertilizer-insecticide.

Claims that such products will make plants immune to insects were called "preposterous" by Coltrane. There is a material known to be at least partly effective in controlling red spiders and some other insects through plant assimilation, he explained, but this material also makes the plant poisonous to animals and human beings.

The Bycolife product was advertised as being "non-poisonous to red-blooded insects and farm animals."

Early Tomatoes Need Phosphate

Slow growth in early set tomatoes often comes from the lack of the mineral phosphorus, according to S. H. Wittwer, of the Michigan State College department of horticulture.

He points out that cold and wet soils early in the season are often responsible for the phosphate and nitrogen not being available. Plants make less root growth and are unable to take up what phosphate and nitrogen may be available. Under these conditions it is important to apply a high concentration of soluble phosphate and some nitrogen in the immediate area of the roots.

A number of high analysis, soluble fertilizers have been placed on the market. Analysis will run from 13 per cent nitrogen, 26 per cent phosphate and 13 per cent potash up to 10 per cent nitrogen, 52 per cent phosphate and 17 per cent potash. The latter materials—high in phosphate—are the most desirable to use. Plants treated with these fertilizers make fair growth in spite of cool weather.

The high analysis fertilizers may be dissolved at the rate of six to eight pounds to 100 gallons of water or one ounce to one gallon. One-fourth to one-half pint of the solution is applied to each plant when the plants are transplanted to the field.

Wittwer suggests that an easier method is to water the plants with the solution before field setting. He recommends watering plants 24 to 48 hours before transplanting and again immediately before field setting. The solution used should be at the rate of one ounce to one gallon of water.

When treated this way, the plant roots and soil are abundantly supplied with phosphate and nitrogen in a readily available form. Good growth and earlier crops are the advantages of such treatment.

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Muriate of Potash

Granular Muriate of Potash

Sulphate of Potash

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Water-Soluble Double Sulfate of Potash-Magnesia

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International

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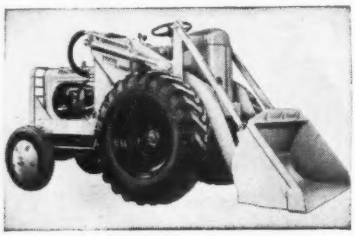
Tractomotive Corporation Announces New Loader

A new materials handling loader is now manufactured by Tractomotive Corporation, Deerfield, Illinois, the company that builds the well-known Tracto-Shovel for the Allis-Chalmers Model HD-5 Track-Type Tractor. This new unit is called the TL-W Tracto-Loader and has a one-half cubic yard standard bucket.

It is mounted on rubber tires and has the bucket over the driving wheels and the steering wheels in the rear. The design, according to the manufacturer, provides exceptionally good traction and makes steering easier, especially where the going is soft. This lessens operator fatigue and eliminates the necessity of dumping part of load to keep from bogging down, which assures maximum production.



TL-W Tracto-Loader

The TL-W's short overall length, 12 ft. with bucket down, and narrow width, 5 ft. 9 in. (outside tire measurements) mean that it is small enough to be used where working areas are limited. Close quarter operation is possible, too, because it does not have to ram into material to get a load. The bucket is eased into the material and picks up load through forward crowding action and an automatic "tilt-back" feature. Loading is speeded up and spillage is held to a minimum.

The bucket is hydraulically operated and positively controlled. It can be dumped in part or all at once and will fully load average dump trucks.

Special service features that simplify maintenance of hydraulic system are one-piece, seamless steel tubings and hydraulic hose lines with detachable and re-usable fittings.

The Tracto-Loader is sold exclusively through Allis-Chalmers industrial track-type dealers. More information may be obtained from a dealer or by writing directly to the company.

Finley Elected Bemis Officer

David M. Finley, chief accountant of Bemis Bro. Bag Co., has been elected assistant secretary of the company. He has been with the Bemis Accounting and Auditing Department since 1937.

Mr. Finley is a certified public accountant and a member of the American Institute of Accountants, the Controllers Institute of America and the Tax Executives Institute.

New Edition of "Hunger Signs in Crops"

The National Fertilizer Association has announced that a new edition of its book, "Hunger Signs in Crops," will be ready for distribution about September 1st. This volume, which has achieved great popularity with agriculturists, scientists, fertilizer executives, etc., has gone through three printings. So much new information on this subject has developed in the past few years that the Association decided to issue a revised edition incorporating this new material.

Illustrated by 110 plates in full color, as well as by many other black-and-white engravings, the symptoms of plant food deficiency are fully covered for a number of the principal crops, including tobacco, corn,

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Baughman Self-Unloading Body with attachments keeps busy doing all kinds of profitable jobs. Spreads lime, distributes phosphate, unloads or spreads road rock, delivers coal or grain, etc., etc., etc. Photo shows Phosphate Spreader Attachment which spreads 16½' widths . . . covers 2 acres per mile at speeds up to 15 mph. Easily attached or removed.

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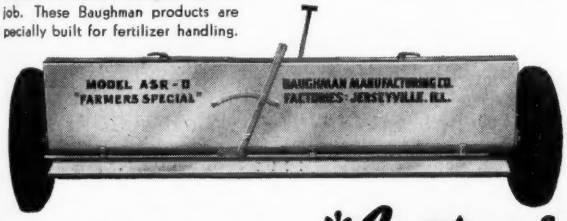

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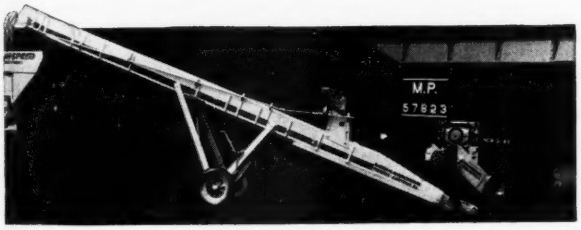

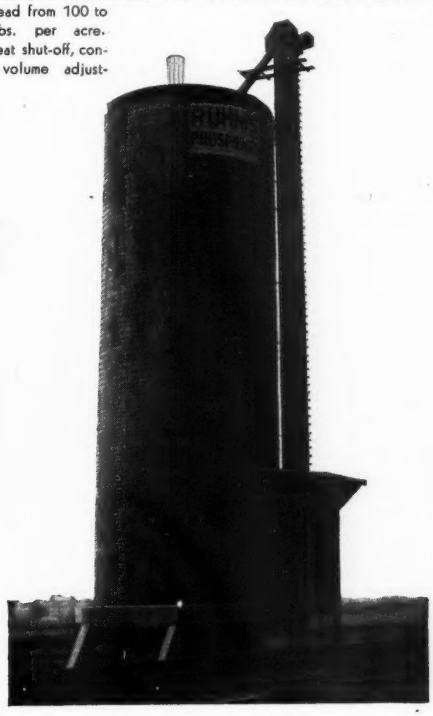

The wise commercial operator reduces his handling costs and increases his service and efficiency by using equipment designed for the job. The Baughman Belt & Bucket Elevator (right) stores in bulk and delivers in bulk—eliminates bagging. The Baughman Open Trough Belt Conveyor (above) loads and unloads up to 60 tons per hour. Portable and perfectly balanced.

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small grains, potatoes, cotton, vegetables, legumes, citrus and deciduous fruits. Compiled by eighteen leading agronomists, this volume of 370 pages should be of even greater service to agriculture than its predecessor.

The book is priced at $4.50 per copy postpaid and sales are being handled at the office of the National Fertilizer Association, 616 Investment Building, Washington 5, D. C.

Campbell Soup Co. Issues Soil Booklet

As an aid to the many farmers and market gardeners who grow the tomatoes and other vegetables used in their well-known line of products, the Campbell Soup Company's Department of Agricultural Research, Riverton, N. J., has issued a carefully prepared booklet of 100 pages entitled "Know Your Plant and Soil Requirements." This monograph, which is No. 3 in the series, was prepared by Jackson B. Hester and Florence A. Shelton, of the Campbell Agricultural staff. With the aid of 37 tables and 27 illustrations, the plant food requirements for a variety of vegetable crops are demonstrated as they apply to the soils cultivated by the Campbell growers. The methods of soil analysis used by the department are described in quite some detail, which impresses the grower with the importance of accuracy in planning his soil requirements.

Record Sulphur Production in 1948

According to reports of producers to the Bureau of Mines, United States Department of the Interior, production of native sulphur in 1948 surpassed the previous record by nearly 10 per cent. Output totaled 4,869,210 long tons. Imports were negligible and exports, lower than in the previous year, were still very large. Apparent sales increased by more than 175,000 long tons and stocks on December 31, 1948, were 146,000 tons lower than at the end of 1947. Sulphur recovered as brimstone, sludge, and paste gained two per cent, and as hydrogen sulphide from industrial gases, 25 per cent. Pyrite production was about one per cent lower than in 1947.

SALIENT STATISTICS OF THE SULPHUR INDUSTRY IN THE UNITED STATES, 1947-48, IN LONG TONS

	1947	1948 (Prelim.)
Native sulphur:		
Mined	4,441,214	4,869,210
Apparent sales[1]	4,839,548	5,015,230
Producer's stocks at end of year[2]	3,371,000	2,225,000
Imported	15	38
Exported:		
Crude	1,229,060	1,262,913
Ground or refined	50,477	32,630
Sulphur recovered as byproduct from industrial gases:		
As brimstone, sludge, and paste	43,427	44,369
As hydrogen sulphide	20,631	25,792
Sulphur equivalent of byproduct sulphuric acid from copper and zinc plants	237,000	(3)
Pyrites:		
Produced	940,652	928,531
Sulphur content (per cent).	41.7	41.8
Imported	126,533	107,411

[1] Calculated from production and change in stocks during the year.
[2] Includes stocks at mines, in transit, or in warehouses.
[3] Not available.

Link-Belt Appoints Riley District Manager at Newark

Link-Belt Company announces that John D. Riley has been appointed district manager at Newark, N. J., to succeed George E. Ramsden, who died on April 10.

Announcement is also made that the Newark office has expanded its forces and moved to larger, more convenient quarters at 212 Essex Building, 31 Clinton St., Newark 2.

Mr. Riley has had wide experience in the application of Link-Belt products, having entered the employ of the company's Philadelphia plant in 1934, where he successively served the shovel and crane, retail store and general sales departments.

Since 1939, he has been district sales engineer at the company's Boston office, serving customers throughout the states of Maine, New Hampshire and northeastern Massachusetts.

Mr. Riley attended Wharton School of the University of Pennsylvania, majoring in business administration.

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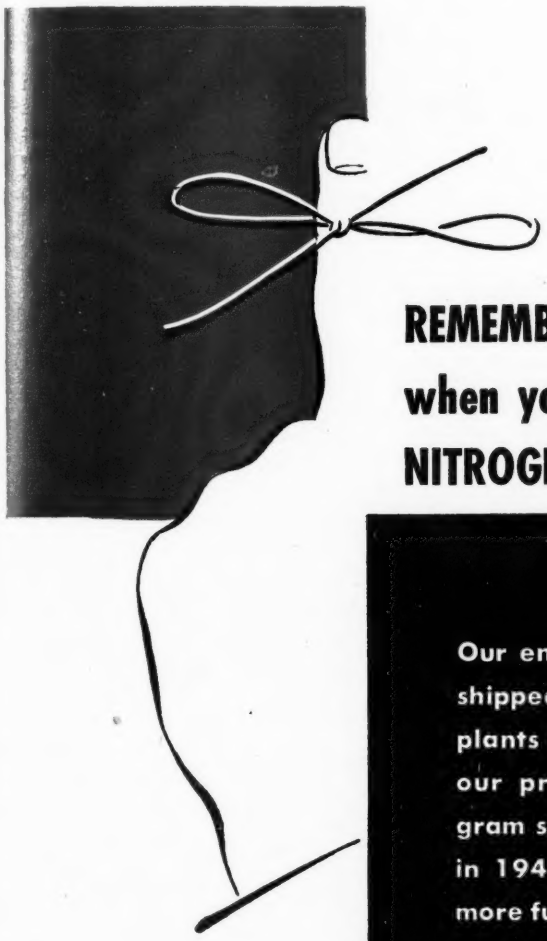

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- **Nitrogen Solutions**
- **Sulphate of Ammonia**
- **Ammonium Nitrate Fertilizer**
- **Anhydrous Ammonia**

Chemical Division
LION OIL CO.
El Dorado, Arkansas

Technical service available to fertilizer manufacturers

LION

April Sulphate of Ammonia

Production of by-product sulphate of ammonia continued at high levels during April, according to the figures of the U. S. Bureau of Mines. Output of by-product material totaled almost 73,000 tons, a decrease of only 2.4 per cent from the longer month of March. In addition, 4,318 tons of sulphate was produced at the same plants from purchased synthetic ammonia. Total production for the first four months of 1949 was 13 per cent higher than during Jan.–April, 1948. Shipments during April were slightly greater than production and consequently by the end of the month, stocks on hand at producing plants had dropped to 13,482 tons.

The production of by-product ammonia liquor continues at the rate of approximately 2,000 tons NH_3 per month. Only a small amount of this material was on hand at the end of the month.

	Sulphate Ammonia		
Production	From By-Prod. Ammonia Tons	From Purchased Ammonia Tons	Ammonia Liquor Tons NH_3
April, 1949.....	72,890	4,318	2,132
March, 1949.....	74,657	4,461	2,086
April, 1948.....	54,468	1,953	1,719
Jan.-Apr., 1949...	289,557	17,042	8,339
Jan.-Apr., 1948...	262,516	8,611	7,893
Shipments			
April, 1949.....	73,262	4,347	1,556
March, 1949.....	80,776	4,650	1,701
April, 1948.....	56,008	1,951	1,617
Stocks on hand			
April 30, 1949....	13,482*	—	528
March 31, 1949...	14,333*	—	481
April 30, 1948....	19,132	—	671

*Includes small amount from purchased ammonia.

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BRADLEY PULVERIZER COMPANY
Allentown, Penna.

SERPENTINE SUPERPHOSPHATE

(Continued from page 10)

deposit was ground and incorporated in fertilizer mixtures for turnip and swede crops in Otago and Southland. Altogether some 20,000 tons were used in this way. The development of these deposits was described by I. L. Elliott and A. G. Elliott (*6*).*U*

Manufacture and Experimental Results

The chemistry of the process which is undergone when superphosphate is reverted with serpentine was investigated by Askew (*7*), who interpreted his results as indicating the formation of a mixture of dimagnesic and tricalcic phosphate, with the former in considerable excess. In practice the reversion was relatively easy to achieve and involved very little modification to existing machinery in fertilizer works, while such modifications as actually were made were principally along the lines of supplying additional storage space for stock piles of serpentine, together with the necessary drying and grinding plant. Some fertilizer works failed to install machinery for drying, and consequently the commercial material sent out to farmers was, in the initial stages, far from ideal. Typical analyses of commercial serpentine superphosphate and superphosphate are set out below:

	Superphosphate	*Serpentine Superphosphate*
Percentage of total P_2O_5	23.8	16.4
Percentage of citric-soluble P_2O_5	....	13.5
Percentage of water-soluble P_2O_5	19.9	2.6

Compound	*Per Cent*
$Ca_2(H_2PO_4)_2\ 2H_2O$	1.9
$Ca\ H.PO_4\ 2H_2O$	3.6
$Ca_3(PO_4)_2$	17.7
$CaSO_4$	36.7
$MgHPO_4 7H_2O$	29.1*
Unreacted serpentine	7.0
F_2O_3 and $A1_2O_3$ from reacted serpentine	0.5
SiO_2 from reacted serpentine	4.7
Hygroscopic moisture	1.9
	103.1

———* Almost certainly not fully hydrated.

As phosphate rock from Nauru and Ocean Islands became used up, lower-grade phosphates were imported from Kosseir, Safaga,

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and Florida, with a consequent reduction of the P_2O_5 content in the fertilizers manufactured from these rocks. In order to achieve some uniformity of product it became necessary for the Department of Agriculture to introduce a serpentine superphosphate control order, which set out certain specifications both for the serpentine to be used and the finished product. These specifications were as follows:

Prescribed Standards	Margin of Tolerance
Serpentine Superphosphate:	
Phosphoric anhydride (P_2O_5) content	
(a) Soluble or insoluble; not less than 15 % by weight:.....	0.5% by weight
(b) Soluble in water: Not more than 4% by weight:.....	0.5% by weight
(c) Soluble in citric acid of the strength prescribed by Regulation 14 of the Fertilizer Regulations, 1928 (including the percentage soluble in water): Not less than 13% by weight	0.5% by weight
Maximum size of particles in any sack	
(a) All particles to be capable of being passed through a No. 6 British Standard wiremesh sieve	No margin of tolerance
(b) No less than 60% by weight of the particles to be capable of being passed through a No. 16 British Standard wiremesh sieve	2.5% by weight
Serpentine Rock:	
Magnesium oxide (MgO) content not less than 25% by weight	0.5% by weight
Fineness of grinding	
(a) All the rock to be ground so as to be capable of being passed through a No. 18 British Standard wire mesh sieve	No margin of tolerance
(b) No less than 50% by weight of the rock to be ground so as to be capable of being passed through a No. 100 British Standard wiremesh sieve	2.5% by weight

Later observations on the manufacture of serpentine superphosphate have suggested that the product would be equally effective if the reversion were carried out by 1 part of serpentine to 4 parts of superphosphate. This would lead to a higher total P_2O_5 content and probably also to a slightly higher water-soluble P_2O_5 content. To carry out this suggestion effectively, careful selection of the serpentine rock will be necessary, together with drying and fine grinding to ensure that the serpentine reacts fully with the superphosphate.

Present and Possible Future Position of Serpentine Superphosphate

Since the summary of experimental evidence was made in 1941 by Elliott and Lynch (*loc. cit.*) and the decision was made by the National Council of Primary Production to revert all superphosphate manufactured into serpentine superphosphate, experimental work with this product has been continued.

Observational trials on pasture show no change in the position since it was previously reviewed; *viz.*, most of the trials indicate that, weight for weight, serpentine superphosphate gives a response equivalent to that given by superphosphate. In certain districts, however, *e. g.* North Taranaki and Waihi, serpentine superphosphate has given responses superior to those given by superphosphate when these fertilizers were applied at the same rates per acre.

There are, however, a number of somewhat more critical trials on pastures where yields have been measured by mowing and where applications have been made on the basis of equivalent amounts of P_2O_5. In some trials there is little evidence to support the theory of serpentine superphosphate being any more effective than superphosphate per unit of phosphoric acid. The evidence for this statement is to be found from unpublished material dealing with trials at the Marton Experimental area and at the Soil Fertility Research Station, Hamilton. In at least one of these trials the results are only preliminary. On the other hand, one trial for which 8 years' pasture production records are available suggests that serpentine superphosphate has a greater efficiency per unit of P_2O_5 than superphosphate. No yield trials have yet been conducted in those areas where from observational evidence serpentine superphosphate has given greater pasture award improvement than superphosphate.

At the present time many farmers in the North Island have become accustomed to using serpentine superphosphate and are satisfied with the results. The manifest advantages which it possesses in its ease of

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handling and storage and its failure to cause damage to sacks and germinating seed have no doubt had a lot to do with its popularity. It appears likely that serpentine superphosphate has come to stay in New Zealand and that the demand for this material will steadily increase, even though it appears unlikely that the whole of New Zealand's output of superphosphate will be reverted with serpentine. Limiting factors are likely to be the inadequate supplies of serpentine rock from sources readily available. Although there are abundant sources of supply, many of these are far removed from existing transport facilities.

Following on New Zealand's experiences with this material a certain number of overseas requests have been received for experimental quantities of this fertilizer. For instance, a considerable number of trials were carried out in Australia, but there the results generally were unfavourable. It appears most probable that the climatic differences and soil differences between the two countries explain its failure in Australia. Trial work was also carried out in Great Britain and some satisfactory results were obtained. It therefore appears likely that serpentine superphosphate may have a place in countries outside New Zealand where soil and climatic factors are relatively similar.

Although there is in general no evidence as yet of a magnesium deficiency appearing in the pasture lands of New Zealand, such deficiencies have been observed by workers at Cawthron Institute on fruit trees, and there is reason to believe that magnesium deficiency of friut trees and various horticultural crops is fairly widespread. There is also evidence to show that the losses of magnesium from some soils are high; measurements on one Waikato soil indicate a very high annual loss. Part of the value of serpentine superphosphate in the future may be shown to result from the ability of this material to replace losses of magnesium from the soil.

In New Zealand, as elsewhere in the world, there has been a continuous search for a phosphatic fertilizer whose efficiency is higher than those at present in use. It has been estimated that of the phosphorus applied as fertilizer only some 12 to 30 per cent is recovered by the plant. In many New Zealand soils fixation severely limits the effectiveness of water-soluble phosphates. Serpentine superphosphate may therefore be regarded as an attempt to find for this country a more efficient phosphatic fertilizer than superphosphate.

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APRIL TAG SALES

(Continued from page 14)

In the four Midwestern states, sales for April totaling 149,000 tons were about 26 per cent below those reported for the same month a year ago. Calendar and fiscal year cumulative totals for these states, however, were substantially higher at the end of April than they were last year, showing about the same rate of increase as the Southern states.

N. F. A. JUNE MEETING

(Continued from page 8)

bers are Mrs. Russell Coleman, Chevy Chase, Md.; Mrs. Walter Crady, Louisville, Ky.; Mrs. Chester S. Edwards, New York City; Mrs. Spencer F. Elwood, Bexley, Ohio; Mrs. Burton A. Ford, Allentown, Pa.; Mrs. G. H. Gleason, New York City; Mrs. E. M. Kolb, Ridgewood, N. J.; Mrs. Maurice H. Lockwood, Winnetka, Ill.; Mrs. John E. Powell, Columbus, Ohio; Mrs. E. S. Russell, Hadley, Mass.; Mrs. C. D. Shallenberger, Shreveport, La.; Mrs. J. E. Totman, Baltimore; and Mrs. Travis S. Whitsel, Atlanta.

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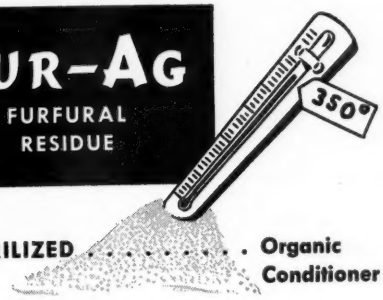

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CARS AND CARTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHEMICALS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Pittsburgh Agricultural Chemical Co. Pittsburgh, Pa.
Spencer Chemical Co., Kansas City, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Arkansas Rice Growers Corp. Assn., Stuttgart, Ark.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
National Lime & Stone Co., Findlay, Ohio
Quaker Oats Company, Chicago, Ill.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CYANAMID
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Machine Works, Aurora, Ind.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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Pittsburgh Agricultural Chemical Co. Pittsburgh, Pa.

LEAD BURNERS
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MACHINERY—Elevating and Conveying
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Kent Mill Co., Brooklyn, N. Y.
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Stedman's Foundry and Mach. Works, Aurora, Ind.
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MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
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Stedman's Foundry and Mach. Works, Aurora, Ind.
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American Agricultural Chemical Co., New York City
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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

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Lion Oil Company, El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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Monarch Mfg. Works, Philadelphia, Pa.

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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

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American Agricultural Chemical Co., New York City
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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City

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American Potash and Chem. Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

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McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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SULPHURIC ACID
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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Jackle, Frank R., New York City
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U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
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International Minerals & Chemical Corporation, Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

TAGS
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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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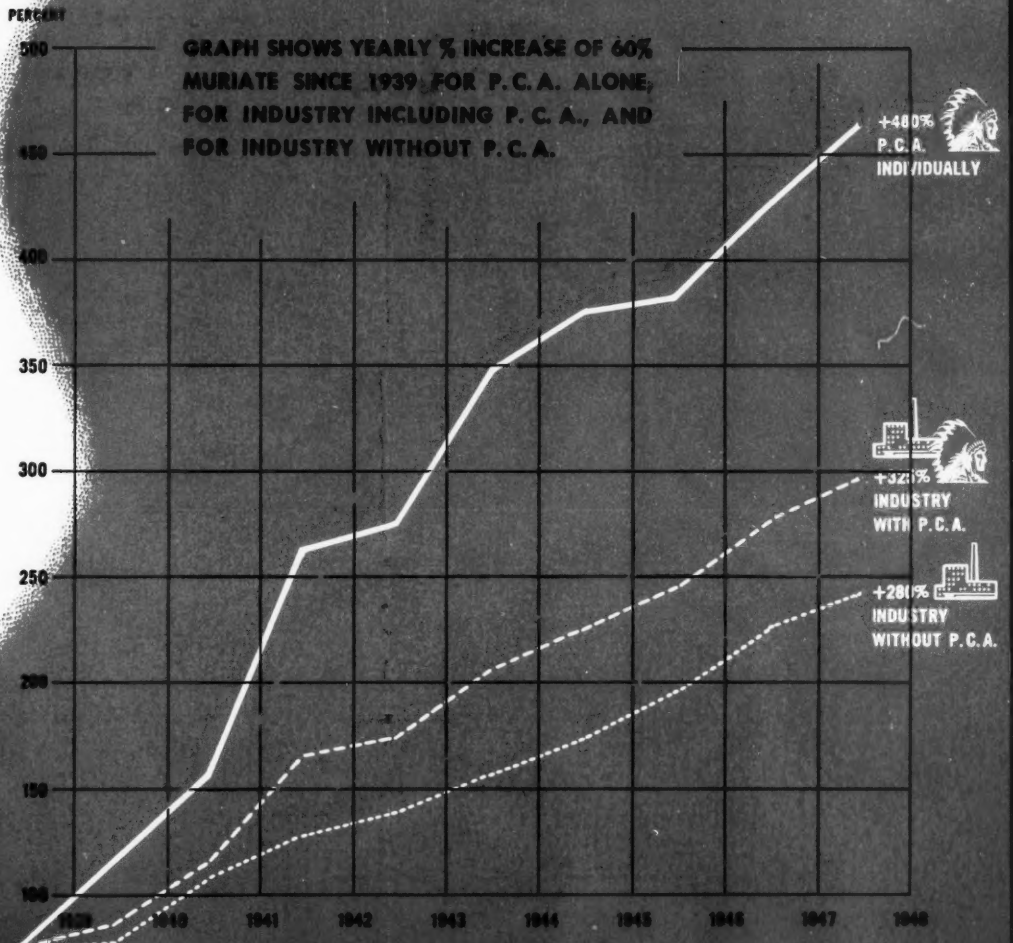

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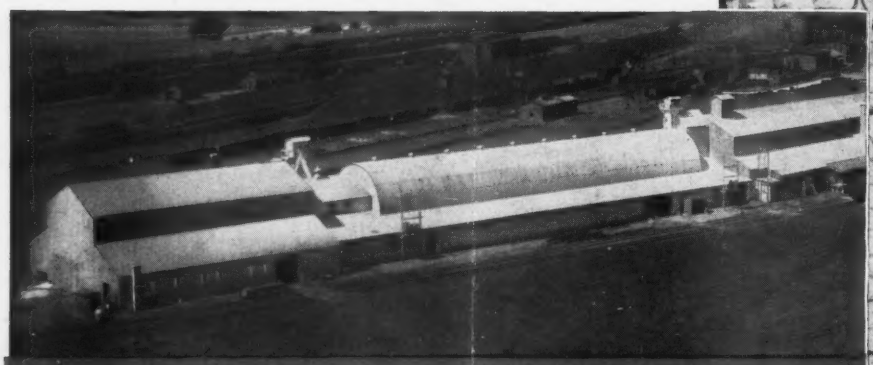

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